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AUTHOR Wiltz, L. Kate

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ABSTRACT

This document contains the proceedings of the Teton Summit Conference for Program Evaluation in Nonformal Environmental Education. The Summit was co-hosted by the Teton Science School (TSS) and The Ohio State University with the goal of improving efficacy of evaluation in environmental education. Contents include: (1) What Is Evaluation? (2) For Whom Is Evaluation Done? (3) Why Evaluate? (4) How Is Evaluation Done? (5) What Is and What Should Be? (6) The Politics of Evaluation (7) What Environmental Education Evaluation Can Look Like (8) P.A.R.K.S. as a Model; (9) Valuing Programs from an Economic Perspective: Cost Analysis in Environmental Education Evaluation; (10) Cost-Benefit and Cost-Effectiveness; (11) Other Factors When Considering Costs; (12) Should Environmental Education Program Evaluation Be Required? (13) Possibilities: Where Do We Go From Here? (14) Matching; (15) Evaluation and Research; (16) A Culture of Evaluation; and (17) Identifying the "It" in Evaluation. Appendices include a list of summit participants, materials from the summit, and a resource guide. (YDS)

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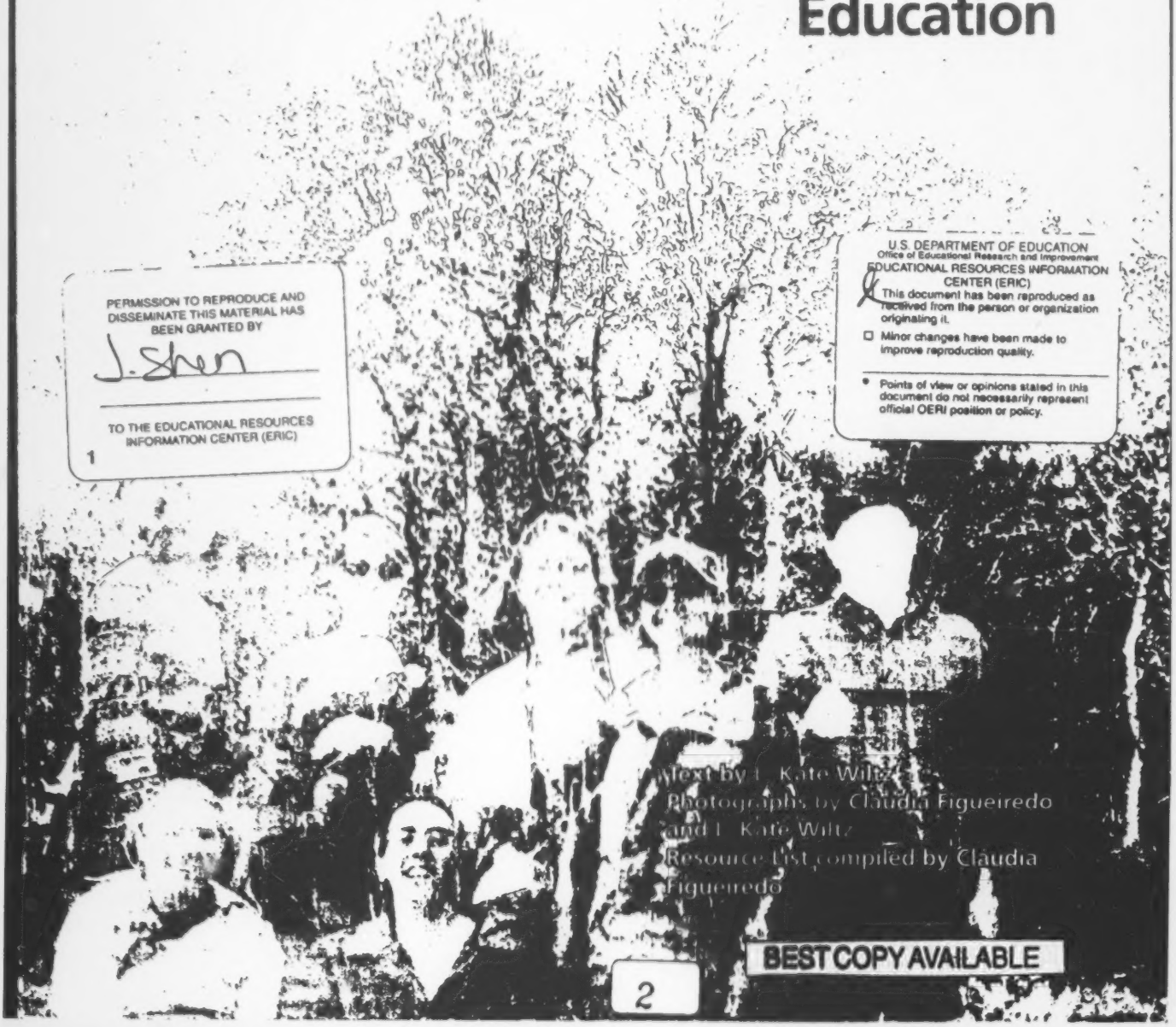
Proceedings of

The Teton Summit

for Program Evaluation in Nonformal Environmental Education



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Proceedings of

The Teton Summit for Program Evaluation in Nonformal Environmental Education

Text by L. Kate Wiltz
Photographs by Cláudia Figueiredo and L. Kate Wiltz
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Thanks to all who made the Summit and this publication possible. We could have accomplished little without the support of those who saw the potential of this type of intellectual exploration: The U.S. Fish and Wildlife Service, The National Park Foundation, and The Brainerd Foundation. Also, many thanks to our facilitator, Michael Patton, whose insight inspired and led the conversations at the Summit and to the coordinators of the Summit, Emmalou Norland and Jack Shea. Finally, the careful documentation of the Summit discussions would have been impossible without the dedication to task and attention to detail of The Ohio State University graduate student team: Cláudia Figueiredo, Liz Hall, Cindy Somers, and Gina Zwerling.

Preface

The following text was written in order to capture the spirit of the conversations that took place over two and half days at the Teton Science School in Kelly, Wyoming, in May 2000. I have chosen to reflect on the dialogues and presentations that took place at the Summit, and then to document their collective course. Over those few days, the participants in the Summit explored the topic of evaluation under the guidance of the Summit facilitator, Michael Patton. As he came to understand the concerns of his audience, and they came to some consensus on what evaluation means to them, the group of participants considered different ideas, issues and questions regarding their work in environmental education.

Although written by just one person, the words here belong to the entire group of Summit participants. By no means did we speak with one voice during the Summit - the conversations were more complex and considered many points that I am sure are not captured in these pages. However, several people have worked to capture the ideas and viewpoints expressed the weekend of May 19-22, 2000. We have put together what we hope to be a coherent and cohesive discourse on the topic of environmental education evaluation, in order that this document may be of some use to others who wish to look into this emerging specialization. What follows is an interpretation of the journey we took last May - the Journey to the Summit.

Teton Science School

Introduction I

With the principle goal of improving the efficacy of evaluation in environmental education, the Teton Science School (TSS) and Ohio State University (OSU) co-hosted the Summit for Program Evaluators and Environmental Educators in May 2000, in Jackson Hole, WY. The concept of this summit originated at the June 1999 "Education for the Wild" symposium in Shepherdstown, WV. Sponsored by the Murie Center and the National Conservation Training Center, U.S. Fish and Wildlife Service, this conference gathered professionals working in environmental education on public lands to create a forum of diverse expertise and experience. The TSS - OSU Summit was intended to be a "next-step" in the examination of evaluation in environmental education. The conference convened recognized leaders in the fields of non-formal environmental education and program evaluation in order to initiate a discussion on the best methods of determining strengths and weaknesses in environmental education.

Information sharing, creative problem solving, and strategic planning allowed Summit participants to explore relevant issues surrounding environmental education evaluation, identify barriers to effective program evaluation, and begin the process of standardizing the criteria for evaluation. The ideas and strategies explored during the Summit are presented here in the event proceedings. Summit highlights included facilitated discussions by Michael Patton, a nationally recognized expert in evaluation research, use, and practice, and small learning groups discussing topics such as the relationship between evaluation and research, how to define evaluation and its purpose in educational programming, the costs and benefits involved with program evaluation alternatives, and the standards of practice in environmental education.

Through the Summit, we hope to stimulate further examination of the evaluation issue. As responsible environmental educators and center administrators, we are always trying to improve the efficacy of our programs. We are asked to justify and articulate their outcomes to parents, school systems, the community, and funders. Program evaluation and assessment are an essential point in the maturing process of schools and education centers. This Summit has created a platform on which relationships between environmental education and assessment experts can be built and around which future work can be centered.

Jack Shea

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Jack Shea is the executive director of the Teton Science School in Kelly, WY. He has worked in the field of nonformal science education for over 25 years.

Introduction II

We would like to take this space to provide some theoretical background to the Teton Summit and to highlight the need for the dialogue that was begun at the Teton Science School this spring.

Environmental education is an interdisciplinary approach to learning how the natural world intersects with the social, political, and economic arenas within which humans exist. Environmental education and interpretation organizations around the world have proliferated in an effort to create an 'environmentally literate' populace. Until recently, however, many of these organizations have not had to 'prove' that they were accomplishing their goals. But today, more and more funding organizations have begun to require evidence that targeted goals are being achieved. For example, the Government Performance and Results Act of 1993 has changed the focus in governmental accountability from program monitoring and auditing to the employment of evaluation

processes to determine if the intended program outcomes are being achieved. This type of accountability is now also being required by non-governmental foundations. As a result, environmental education and interpretation agencies throughout the United States are under great pressure to provide evidence of positive outcomes related to the goals of their programming. This accountability in the form of program evaluation is then incorporated into the decision-making/planning process for future funding allocations.

Program evaluation is the "systematic collection of information about the activities, characteristics, and outcomes of programs for use by specific people to reduce uncertainties, improve effectiveness, and make decisions with regard to what those programs are doing and affecting" (Patton, 1997). Over the past 30 or more years, research in evaluation and program planning has created a large theory base on evaluative approaches and techniques.

Concurrently, research in the field of environmental education has indicated that attention to a number of inputs in a learner's experience can lead to responsible environmental behavior (Hungerford and Volk, 1990), and many private and nonprofit agencies indicate such behavior as a desired outcome in their programming (Simmons, 1993). The linking of program inputs to the desired outcomes across visitors is key to both formative and summative evaluation. Equally important in evaluation, is the linking of appropriate outcomes to the program inputs. These outcomes are contextually, as well as educationally, based.

In the formal environmental education arena, where virtually all studies in environmental education program evaluation have occurred, students are usually 'tested' for outcomes such as knowledge, skills, and behavior. Nonformal environmental education and interpretation that takes place on public and private land across the country differs from formal education endeavors in that these non-captive audiences are more heterogeneous and are viewed as clients or visitors rather than students. With nonformal environmental education in which program goals and objectives are frequently not as well defined and formal environmental education that occurs in nonformal settings, outcome measurement can be more challenging.

The above factors indicate the need for increased interaction between environmental educators, funders with an interest in environmental programming, and professional program evaluators. There is an emerging interest in both fields for expanded interaction and exchange. The American Evaluation Association has established a topical interest group for its members interested in environmental program evaluation, and the North American Association for Environmental Education held a workshop on program evaluation at its 1999 national conference.

The primary purpose of the Teton Summit was to enhance program evaluation in environmental education by facilitating communication among professionals in nonformal environmental education, evaluation, and environmental education grantmaking. By sharing the experience and expertise of participants from the above fields, the summit worked toward elevating the quality and utility of evaluation in nonformal environmental education while maintaining the integrity of the evaluation profession. Michael Patton discussed the theory base and the standard approaches utilized in program evaluation. Researchers and evaluators working in environmental education added their shared their perspectives and strategies in evaluating environmental education programs across the country. Environmental educators delineated the unique needs and context of nonformal environmental education programming. Finally, researchers and representatives from granting foundations shared their broad-based experience and perspectives to enable effective communication and application of the ideas discussed.

Emmalou Norland is an associate professor of program evaluation and adult education in the School of Educational Policy and Leadership at the Ohio State University. Currently, she is working for the Inspector General of the U.S. Environmental Protection Agency on the development of an office of program evaluation.

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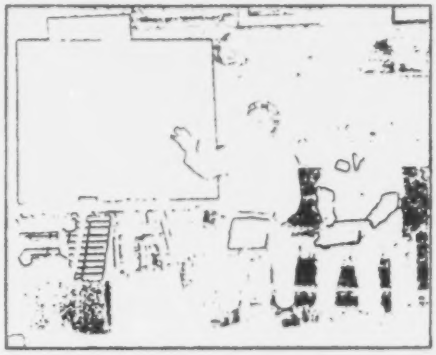
There were four specific objectives of the three-day summit:

1. To convene identified and interested leaders in the fields of nonformal environmental education and program evaluation and to initiate discussion on best practices for environmental education evaluation.
2. To identify and explore some relevant issues surrounding evaluation in nonformal environmental education and barriers to effective environmental education program evaluation.
3. To explore strategies for implementing systemic change in the field of environmental education evaluation and for standardizing the criteria for evaluation of environmental education.
4. To record and document the ideas and strategies explored during the summit through the publication of Summit Proceedings.

Under the guidance of Michael Patton, past president of the American Evaluation Association and an experienced evaluation consultant and facilitator, the group of invited participants participated in interdisciplinary group discussions and small group breakout sessions guided the progress of the summit toward meeting the above stated objectives. The group of participants shaped the course of the Summit as the event unfolded at the Teton Science School, and we explored some specific questions including:

- What is the relationship between evaluation and research?
- What is evaluation and what purpose does it serve in environmental education programming?
- How do environmental education professionals analyze the costs and benefits involved with program evaluation alternatives?
- What are the standards of practice in environmental education and evaluation that would inform guidelines for environmental program evaluation?



Jack Shea and Emmalou Norland

The Teton Summit began a discussion across disciplines that aims to improve environmental education and program evaluation in both theory and practice. The collaborators and participants at the summit worked together to expand the understanding of these disciplines and strategize best practices for evaluation in environmental education.

Society needs quality environmental education programs that adapt to the changing needs of learners and educators and incorporate the current socio-political context into an ecological framework. Improving upon the ability of the environmental education practitioner to incorporate strong evaluations into his or her programming benefits the educator and the parent organization as well as visitors and students. Not only will such collaboration enable more fundable grant proposals, it will illuminate clearer pathways toward achieving the established benchmarks for excellence in environmental education. The Teton Summit set us down the path toward improving environmental education programs across the country.

Emmalou Norland and L. Kate Wiltz

Introduction III

The field of evaluation has been developing and changing rapidly, and it parallels a lot of the issues in environmental education. The changes in both fields are driven in part, I think, by the real challenge of this kind of work: that of matching response appropriately to need. This involves matching the right kind of evaluation to the type of program being looked at and the program's circumstances and needs. It turns out that evaluation is a multifaceted thing, as is environmental education. So the challenge ends up being a matching challenge, not unlike the challenge in doing good environmental education, that is, matching the program to learners' needs and capabilities.

For example, when you are running a wilderness program, the matching challenge ends up being finding the right degree of challenge for a particular group - not putting them in a dangerous situation, but pushing them enough so that they get the fullest experience they can have. You have to make a judgment for each group as to what kind of wilderness experience to provide: what trail to take them on, how steep and how long, how much weight they can carry. Those are the same things you must consider in evaluation - how complicated to make the course, how steep it ought to be, how much weight people can carry, how long it should go on, and how much risk to expose them to.

And there *are* risks with evaluation. Like any powerful tool, evaluation can do tremendous good, but unfortunately I've spent a lot of time in situations where evaluations are doing a lot of harm. Evaluation is not benign. It is not as though you either get it right or nothing happens. This can be dangerous stuff precisely because it is powerful stuff. Those of you who have experienced the down sides know it can affect people's jobs and livelihoods. It can affect future program funding and the higher the program stakes, the higher the evaluation stakes. While I look forward to talking about ways of doing evaluation and the issues of measurable outcomes, I bring to this discussion the concerns of finding myself out there sometimes having to battle with folks who have gone too far and are doing harm with evaluation.

Perhaps the best example of 'outcomes measurement gone berserk' is the when the body count emerged as the primary criteria for evaluating the progress of the Vietnam War. Traditionally, the progress of war was measured by territory held, but in a guerilla war 'who holds territory' doesn't make as much difference. In Vietnam, territory held in the jungle was an ephemeral notion - and not very helpful for assessing the progress of the War. So Secretary of Defense Robert MacNamara and his folks, who were systems analysts, decided they needed a different measure to monitor how the war was going. They came up with the body count. They recognized it as a potentially dangerous measure, so they implemented the body count as a strategic measure that only the generals were supposed to use. It was not supposed to be used to measure unit fitness. It was not supposed to be used at the battalion level, nor at the platoon level. It was a strategic indicator of how the overall war was going.

But what happens when you start measuring things is that, not unlike supposedly "controlled" burns in national forests, they can get out of control. Sometimes the wind blows from an unexpected direction and things come up. On March 16, 1968, when Lt. Joseph Calley went into My Lai and massacred 504 women, children, and old men, he had just been reprimanded by his commanding officer because his body count was low. He went out to increase his performance on the requisite performance indicators.

What we are finding across America, which is in an outcomes mania, is that a lot of folks are corrupting the indicators. Teachers and principals are cheating on standardized achievement tests, not just students, because the stakes for teachers and principals in some districts have become very high. The increase in high-stakes, accountability-driven outcomes evaluation has led to an increase in abuse of evaluation.

Another consideration is the challenge of doing evaluation in ways that are true to our values. It is important that we recognize the complexities of the kind of issues we are dealing with, and that we don't do evaluation in a formulaic way or just follow a recipe. Many people do evaluations just to get them done or to turn in the paperwork, or just to meet a mandate from somebody. Evaluation, through the power of reflection and figuring out what is going on in your programs, can support the things that you care about and provide authentic evidence that helps you do better those things you've dedicated yourselves to.

Michael Patton directs an organizational development consulting business; "Utilization-Focused Information and Training" and is on faculty at the Union Institute Graduate School. Dr. Patton is a former President of the American Evaluation Association.

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We must look at the power of evaluation techniques both to do good and ill. We must look at the values and perspectives that undergird this power. One of the most critical venues for doing this is occurring in organizations such as those represented by the Summit participants. It is ultimately rewarding to work at the leadership level, infusing evaluation thinking into the culture of an organization so that evaluation isn't, as it has so often been treated in education, an add-on or just extra paperwork. I am always excited when I hear, as with the Puget Sound Environmental Learning Center, that they are trying to build evaluation in from the beginning of the program planning process because that is the way to make it work. Planning for evaluation in this way has not been the history of how evaluation has been done and how it came about. But, doing it that way and making it real to those involved can become an important and innovative part of this environmental education evaluation initiative.

The thing that is challenging about evaluation, when working with people who care deeply about what they do, is the skeptical side that evaluation represents. It is a skeptical perspective. It is a 'show me' kind of perspective. It doesn't just acquiesce to passion as a good in and of itself. Caring deeply and intending to do good isn't enough. Evaluation, as a skeptical perspective, asks for some evidence that passion and caring and the strong beliefs that people bring to the things they are doing actually results in the desired good sought. In this sense, evaluation infuses reality-testing into our program world of rose-colored glasses.

One of my avocations is collecting data, stories, and research reports about what appears to be the nearly infinite capacity of human beings to deceive themselves about reality. The emerging evidence from those who call themselves neurological anthropologists, who study how our brains develop, is that one of the strong survival capacities that we have evolved is the incredible capacity to distort reality. It appears to be a survival capability. When the saber-toothed tiger was outside the cave and it looked like everything was hopeless, the Neanderthals had this emergent capacity to believe that tomorrow would be better than today, despite all evidence to the contrary. We seem to have picked up that part of the genome and have carried it forth. The most recent manifestation of that, on which massive amounts of research data are emerging, is in the stock market.

One of the larg[illegible]t, most rapidly developing fields, scholastically, is that of behavioral finance which is the study of how people make decisions about their money. What that field is documenting in very quantitative and very relevant ways for those of you managing your portfolios, is that what goes on in behavioral finance is the same as what goes on in programs. People tend to overestimate their own financial portfolio gains and program staff tend to overestimate their impacts on participants.

Money Magazine and the Columbia School of Finance did a survey in which they asked subscribers to estimate the gains in their portfolios over the last three years, and then the researchers actually reviewed brokerage statements to determine the real gains in portfolios. Over three-fourths of the sample overestimated their gains. A third of the people who said they had made money had actually lost money in the stock market. Males overestimated nearly twice as much as females. People tend to remember their winners and forget their losers in the stock market — which is exactly what people who run programs do. From my experience, the overestimations are nearly the same with respect to the degrees of success in programs.

This environmental education evaluation Summit allows us to bring a positive view of reality testing into this kind of work - work that is driven by passion, as it ought to be. It allows us to explore how one plays out the tensions between our passions, our beliefs, and the way we would like the world to be and

the evidentiary side of programming: the way that it actually unfolds. These tensions emerge both individually within our organizations and collectively in the whole field.

I really think of evaluation, beyond all the methods and beyond all the techniques and measurement, as basically the challenge of countering our human capacity to distort reality. As a bottom line, evaluation offers a set of ways of thinking and tools that can be used to bring some counterbalance to that propensity.

The final challenge that we inevitably confront in gatherings such as the Teton Summit is that, while we want to deal with the methodological and measurement challenges, we all experience the 80/20 rule in one of its many manifestations. In evaluation, that rule describes the phenomenon that most people think that 80 percent of evaluation is about methods and measurement and 20 percent is about figuring out what to do. I think those numbers are actually reversed. Eighty percent of evaluation is about how you think about it, and once you get that piece figured out, the methods and the measurement actually all fall into place. They're not that difficult. Issues in evaluation are not difficulties of measurement or methods. Those things appear to be difficult because of how we think about them.

At the Summit, we looked a bit at ways of thinking about evaluation (of which there are a number) and shared experiences and wisdom around evaluation and some of the ways the field of environmental education looks at it. I think that you will find that as we begin to understand what approaches we want to take in evaluating environmental education programs, it will help put the methods and measurement piece in context and they will fall into place. The traditional way evaluators get themselves into trouble is to begin with the methods and the measurement - to come in and start designing instruments as a way to begin an evaluation process. So in nonformal environmental education program evaluation, we are not going to go there right off the bat. We will sort out what the important questions are and look at some ways of thinking about that. The Teton Summit has begun that discussion and I hope that it continues as we progress into the 21st century.

Michael Q. Patton

Part One: The Journey to the Summit

What is Evaluation?

When delving into a relatively unfamiliar topic or field of interest, it is natural for people to make comparisons to that which is already well known. They see new ideas, concepts and approaches in terms of more familiar frames of reference. Just as when exploring a new culture, some may want to vacation there for a week while others may move there to immerse themselves in the lifestyle; either person needs to learn and understand the language in order to 'get around.'

The starting point for the Teton Summit, and for this document was explore language of nonformal environmental education program evaluation. Agreeing on the meanings, at least for this context, of some common terms was key to getting around as we explored our topics of interest. First, what is program evaluation?

Program evaluation strives to answer the basic question: how do we know what is good? The evaluation process intimidates many people because they see it as a passing of judgment or a terminal assessment of good and evil. The evaluator comes with magical ways and ties to those with the purse strings. He asks questions, pokes and prods, and issues forth findings to be forever catalogued in tomes referenced only by those from whom future funding will be sought. The truth is that the evaluator is an expert - but not necessarily an expert on the program being evaluated! What then is this expertise that evaluators bring to programs?

Indeed, good program evaluation requires expertise *in evaluation*. The evaluator is proficient in questionnaire writing, surveys, interviewing, report writing, to be sure. The expertise involved is less tangible. Program evaluation requires an expertise in three primary arenas: 1) Knowing what's important - which distinctions to draw and which to leave; 2) Situation recognition - being able to detect, categorize, and place into context a variety of situations; and 3) Matching actions to situations in order to achieve that which is really important - problem solving. None of these is any small task, but they are not impossible either. Program evaluation is meant to inform the program, and when the evaluator teams with program experts, the result can do just that.

Evaluation then, has a context. In this case, that context is nonformal environmental education. It is impossible, however, to characterize all nonformal environmental education programming with any detail. Some commonality does exist among the programs and projects across the country that are striving under the guise of nonformal environmental education. Environmental education has been variously defined over the past 30 years; however one of the earliest definitions has guided practitioners and researchers alike: environmental education aims to create an environmentally literate citizenry that is knowledgeable concerning the biophysical environment and environmental problems, is aware of action strategies for solving those problems, and is motivated to work toward their solution (Stapp et al., 1969). The Tblisi Declaration in 1977 produced an internationally endorsed view of environmental education, and incorporated awareness, concern, values, and attitudes, in addition to the knowledge, skills and behavior goals for environmental education (UNESCO/UNEP, 1978). Today, environmental education continues to incorpo-

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"Program evaluation is the systematic collection of information about the activities, characteristics, and outcomes of programs to make judgments about the program, improve program effectiveness, and/or inform decisions about future programming."
(Patton, 1997)

Brian Windrope, Sue Perin, Tom Marcinkowski, Court Smith & Terry McLaughlin examining bear scat found along the hike to Coyote Rock in Bridger-Teton

rate concepts from the traditional disciplines of natural science and social studies, including political science, economics, and cultural studies.

Nonformal environmental education takes place outside the school classroom with students of all ages. It includes (but is not limited to) residential learning environments, parks, nature centers, zoos and aquaria, and museums. Often nonformal learning refers to more than just the physical setting; it also implies that learners are actively directing the course of study - that is, the nonformal audience is noncaptive. A public program at a local park or zoo often attracts an audience of mixed-ages who view their participation in terms of recreation and leisure. The school group visiting a park or museum for an environmental education program is certainly a captive audience, however; the students are not controlling their participation. In this sense, nonformal refers to the setting, not the audience. Environmental education is often conducted in nonformal settings, incorporates experiential learning techniques and is likely to be issue-oriented and place-based. The participants at the Teton Summit represented a variety of educational settings and audiences, and the discussions on nonformal environmental education evaluation were encompassing of these different conceptions.

Environmental education has been variously defined over the past 30 years...

The purpose of the Summit on environmental education program evaluation was not to impose one field upon the other, but to find a common ground upon which to explore issues in the evaluation of nonformal programming in environmental education. This common ground lies in the better, or sound, practices of each field. Better practices, as opposed to the common terminology of best practices, is a tacit acknowledgment of the fact that in both fields, there is not one best way of doing things. On the contrary, the variety of successful environmental education programs and program evaluations are testimony to the fact that there are many ways (grounded in theory, research, and practice) of achieving our best in both fields.

For those of us brave enough to venture into the world of evaluation in the spirit of knowing exactly what our programs are doing, we are quickly inundated with myriad terms: assessment, summative evaluation, formative evaluation, quantitative or qualitative approaches and much more. We must first agree on how to use these terms before we can get to know and use evaluation effectively in our own programming. This discussion is not a definitive one, however. It takes place each time an agency or program begins the formalization of the evaluation process. For that is the nature of truly useful program evaluation - it is born out of that which is most meaningful to those who are most intimately involved in the programming.

Formative evaluation Evaluation that focuses on program improvement; often done during program start-up phases in preparation for a summative evaluation.

For Whom is Evaluation Done?

When evaluation is meant to provide information that can be incorporated into current programming, it is often considered 'formative.' Formative evaluation is something we often do every day informally as we observe participant reactions, test out a new activity, or count the number of participants in our program. Formal evaluation that informs program improvement is not meant to provide information for decision-makers on funding or to assess the program's progress toward goals; it is meant to guide the subtle changes - such as solving unanticipated problems or checking participants' progress toward goals - that can make a program better meet its goals.

Summative evaluation Evaluation for decision-making about the fate or direction of a program. It is meant to inform funders and program leaders as to whether or not a program is sufficiently successful or effective.

Summative evaluation, on the other hand, is evaluation done to determine the relative 'success' or merit of a program. As such, it is typically done toward the end of a program's life or funding cycle. Summative evaluation reports on a program to an "external" audience such as funders or legislators or future patrons who will pass judgment on the program (Scriven, 1994 describes summative evaluation in detail). The reality of summative evaluations is that

they are often just historical documents, as they are performed months after the decision to re-fund, expand or cut a program has been made. Therefore, since formative information is on hand when these decisions are being made (often a year before the program's development cycle is completed), formative data are often used, inappropriately, in a summative manner.

What other words are used by environmental educators and evaluators that may need some clarification? Assessment is one. Evaluators often use assessment to refer to the testing, often cognitive, of individuals, for use in judging individual performance. This is in contrast to the broader term of evaluation, in which individuals may be tested, but the data are analyzed and applied on a collective level. The data are used to judge a program's performance. In environmental education, individual student assessments can inform a program evaluation, particularly if a primary desired outcome of programming is student learning. In nonformal settings, however, student assessments are not always feasible and may not be the most practical way to gather data about program participants.

Outcome is another term with complicated connotations. Outputs, outcomes, and impacts all refer to those results of our programming that we hope to achieve and measure, or at least document, with evaluation. While outputs are typically numbers (as in participants) or products (as in books or courses), outcomes are generally broader concepts, (reactions, affective or cognitive changes) that the program participants take away from the program experience. To inform environmental education programming, both outputs and outcomes must be measured. Knowing a program's participant numbers and products may not always be the most useful information to the program developers. Accounting for participant reactions and their attitude and behavior changes after a program is often much more meaningful to those directing the course of an environmental education program. Program impacts are longer-term outcomes, and include those secondary outcomes in which groups beyond those who participated in the programming are affected or change as a result of the program. In environmental education programming, our goals are often stated in terms of broad program impacts such as stewardship for a resource or a more informed citizenry.

Developmental evaluation Evaluation undertaken for the purpose of supporting program, project, staff, or organizational development. The evaluator teams with program leaders to facilitate long-term discussions and explorations of continuous program improvement, adaptation, and intentional change.

Why Evaluate?

Program evaluation is undertaken for a variety of reasons and with a variety of anticipated benefits. Often in nonformal environmental education, we are seeking to affect the participants' attitudes or feelings about a place or a resource. Alternatively, we sometimes want participants to feel empowered to make decisions and act on particular issues. These are very difficult attributes to measure. However, at some point in the program process, it becomes important to verify whether participants' attitudes, feelings, and behaviors are changing - whether the program is achieving its stated purpose. Programmers want to know whether their programs are working. Funders want to know if their money was well spent.

"It is often better to have weak measurements of important things than to have strong measurements of unimportant things."
Michael Q. Patton

Evaluation should be useful - it should answer the questions that those involved need and want to have answered. Leaders in educational organizations have to be able to identify their program weaknesses in order to learn and to improve programming. Evaluation provides a basis for program improvement that goes beyond cursory feedback that often says, "Everything is going great!" Program evaluation can target specific valued outcomes and provide the information program leaders need and want.

Evaluation should be useful - it should answer the questions that those involved need and want to have answered.

In most fields, a supporting research base lends context to the practice, and program evaluation questions are often easily derived from a combination of specific program outcomes and the implications indicated by current research.

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In nonformal environmental education, the research base is relatively undeveloped and the program outcomes are often difficult to measure and nearly impossible to connect to long-term impacts. Connecting a student's participation in a wilderness program to a subsequent voting record on environmental issues is quite a task. Program leaders tend to determine the criteria for evaluation based on the desired outcomes that they value and see as most pertinent to furthering their educational mission. Without research to strongly correlate particular outcomes such as 'positive attitude toward polar bears' to larger mission goals such as 'stewardship of the arctic nature preserve,' program leaders must rely on their mission, experience, intuition, and/or instincts and values to guide their program evaluation questions.

Thane Maynard, Stephanie Pittard, and Patti Reilly discussing 'What is Evaluation?'

As research is generated in nonformal environmental education, the linkages will become more clear, and the variables indicating a program's success will be more easily measured. Until then, individual programs will have to determine their own criteria, drawing from experience, existing research, and other evaluation data. As a discipline, too, nonformal environmental education will continue to clarify the common concerns in evaluating environmental education programs.

We must be wary, though, that we don't fall into the trap of measuring that which is easy to measure, deriving outcomes from those results, and letting those outcomes determine what it is that we value in our programs. This process is backwards. Measurement follows from clearly understanding what the outcomes should be - outcomes that are determined by values, such as valuing stewardship behavior or valuing critical thinking skills. Instead of allowing measurement to drive outcomes to determine a sense of program value, good evaluation of environmental education will have that which we value in our programs driving our desired outcomes, and those outcomes determining measurement. It may not be easy to measure the stewardship ethic in program participants, but if that truly is what the program aims to instill, and it is what the stakeholders of a program want to know about, it is the variable that must be examined.

Even when environmental education programmers are agreed as to their evaluation questions and desired outcomes, other issues can arise that complicate the practice and use of evaluation. How we choose to operationalize our evaluation questions and the outcomes to which they refer can result in differences in professional opinion as to the best evidence or methodology to use.

If a student who experiences an environmental program with an ultimate desired outcome of informed environmental decision-making chooses to maximize his or her energy consumption instead of conserving, have we failed to meet our program goals? Is the student applying his knowledge in a thoughtful and responsible way, or has the message of informed decision-making been lost on this student? How do we know that the participant has met our goals? When these types of value-laden disagreements exist, often what is needed is an infusion of data into the philosophical debate. Although in the long term, research in environmental education will help guide our programming, evaluation can provide individual environmental education programs with the data they need to improve today.

How is Evaluation Done?

The Joint Committee on Standards for Educational Evaluation adopted a set of standards for the practice of evaluation in 1981 and revised those standards in 1994. These are the guiding principles for better practices in the field of evaluation, and are at the forefront of good program evaluation in nonformal environmental education. There are four primary categories of standards. They are:

Utility

The Utility Standards are intended to ensure that an evaluation will serve the practical information needs of intended users.

Feasibility

The Feasibility Standards are intended to ensure that an evaluation will be realistic, prudent, diplomatic, and frugal.

Propriety

The Propriety Standards are intended to ensure that an evaluation will be conducted legally, ethically, and with due regard for the welfare for those involved in the evaluation, as well as those affected by its results.

Accuracy

The Accuracy Standards are intended to ensure that an evaluation will reveal and convey technically adequate information about the features that determine worth or merit of the program being evaluated

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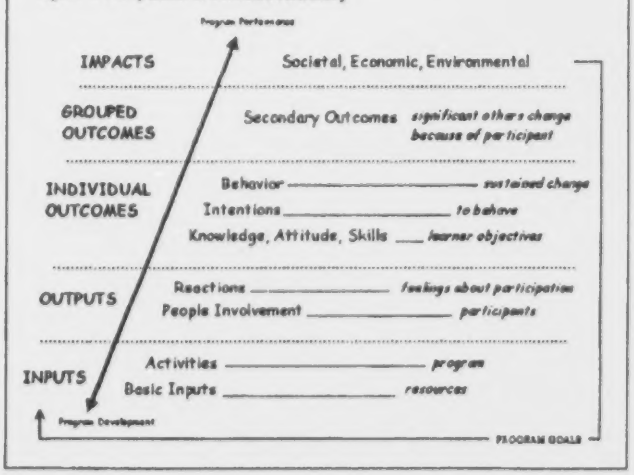
Regardless of the theoretical stance or methodology, the evaluation standards should guide the practice of evaluation.

Regardless of the theoretical stance an evaluator takes or the preferred methods employed, the above four standards for evaluation should guide practice. In fact, program evaluators do come with a variety of approaches and methodologies - some prefer participant questionnaires, others pour over the documents and materials behind the program, while still others rely primarily on direct observation or intensive interviews to gather the desired information. In addition to different methodologies, evaluators also subscribe to different approaches and philosophies as to what should be measured. Some look closely at the stated program goals and objectives to guide the evaluation questions. Others determine evaluation questions based on the concerns and questions of stakeholders involved with the program.

Often a process referred to as logic modeling is used to help map out the pieces of an organization's program and provide a mutually understood framework for understanding the intent and functioning of the program. Logic modeling links all of the inputs to a program (money, supplies, human resources, participants) to the desired outcomes of that program (reactions, attitudes, knowledge, behaviors). Bennett's Hierarchy (Bennett and Rockwell, 2000) is a useful model for mapping out a program logic (see Figure 1). In stakeholder-based evaluation, often the evaluator will work with the program leaders to clarify the program components that 'fill in' the levels of the hierarchy. For young or very broad programs, this can be an engaging learning experience to see how the activities that they do with individual program participants directly - or indirectly - link to program outcomes.

Figure 1. Adaptation of Bennett's Hierarchy



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The logic modeling process is most effective if there is research that supports the connections between the levels of the hierarchical model.

The logic modeling process is most effective if there is research that supports the connections between the levels of the hierarchical model. Educational research can often provide the projections that connect activities to specific long-term outcomes and program impacts. It is rarely possible to follow program participants for years after their environmental education experience in order to determine if their hands-on learning activities in woods contributed to positive generalized environmental attitudes expressed in the voting booth. Therefore, environmental educators and evaluators must rely on established research to support these connections, while they focus their evaluation efforts on answering other important, yet more feasibly answerable, questions.

So do we throw out all hopes of aspiring to rigorous measurement, logic modeling, and proving our programs impact under the cloak of feasibility? No. Indeed, accuracy is another of the evaluator's credos. Evaluation requires some level of proficiency in applying valid and reliable measurement techniques, often taken directly from the research journals, to the study of evaluation questions.

One difference between *research* in nonformal environmental education and *evaluation* of nonformal environmental education programs lies in the purpose behind each. Although it is true that often research is done in the context of evaluation projects and vice versa, program evaluation is driven by utility - it's primary purpose is to produce information that is used by the program leaders. Alternatively, research tends to be more concerned with contributing to a body of knowledge.

In environmental education, as with many disciplines, funding is tight and often when there is an opportunity to evaluate a program it is merged with research meant to inform and advance the field. Often it seems that research and evaluation projects race neck and neck in the competition for funding. This situation begs the question: what are the appropriate agendas for environmental education research and evaluation?

During the Summit, participants worked in small groups to explore possible lines of inquiry for future research in nonformal environmental education as well as possible evaluation questions that applied to many of our programs. Many of the themes that emerged in the discussions have both evaluation and research implications and could be found, addressed at different scales, on either agenda. Here are some of the specific topics and questions participants suggested:

Outcomes and affect

- What is environmental sensitivity? - knowledge, human-nature, connection, or affective/emotional experience?
- What are the affective outcomes of environmental education programming (e.g. citizenship, civic responsibility, community participation, values, spirituality)?
- How do experiences affect stewardship behavior?
- What environmental education methods are related to which outcomes (e.g. residential learning)?
- How does the role of gender affect the outcomes of environmental education?

Organizational issues

- What are some challenges to implementing environmental education?
- Does environmental education relate to the goals and missions of the larger natural resource agency or natural resource management?
- Is the mission of the environmental education agency actually communicated in the programming?
- How is the way in which program planners and implementers are involved in the design of evaluation influence the use of evaluation results?
- What is the level of organizational support for program evaluation? Is there staff 'buy in?'

Approaches to environmental education

- Does the length of an environmental education program matter?
- What part(s) of our programs are making the differences?
- What are the goals of "good" environmental education?
- What is the difference between advocacy and educational programs' impact on kids?
- Does participation in short term programs lead to participation in longer-term programs?
- Where should we spend our time? - knowledge experience, affective/sensitivity experience, emotional development/reactions?
- Is there a difference in outcomes between family programs and youth programs?
- Are problem-solving skills enough without place-based skills?

Family and lifestyle

- How is current lifestyle (with relatively fewer outdoor experiences) affecting kids?
- What do parents think about environmental education programs?
- What do parents learn from their kids? Is there a trickle-down effect?
- Does mentoring of younger kids by older kids in environmental education have effects on self-esteem?

Longitudinal outcomes and impacts

- What are the long-term effects of environmental education? Longitudinal data are needed to understand our impacts; however, the benefit is sometimes exaggerated. Long-term data following a period of 3 to 5 years may be the most beneficial, but longer studies can garner diminishing returns as the popular culture changes and attitudes begin to reflect those changes.
- Does environmental education make a difference?

Relationship to/role in formal education

- What are the benefits of outdoor experiences or residential experiences as compared to classroom science? Are there topics that are better learned outdoors?
- Is our environmental education relevant to state standards / curriculum development?
- How do environmental education programs relate to formal pedagogical programs?
- Teacher training - impacts of long-term professional development, influence on students? What teaching techniques do teachers gain from our professional development programs? Do they use them? How does exposure to environmental education affect teachers?

Research and data collection

- Are anecdotal data useful, valuable? What is the best way to use them?
- How does neurological research apply to environmental education?
- Compilation and synthesis of research data from the fields of environmental education, adult education, science education, psychology, and natural resources?
- Can we do an experimental designed study on environmental education participants vs. non-participants
- What does the environmental education audience look like in terms of their expectations and abilities?

Role of technology

- What is the difference between virtual and real experiences in terms of efficacy?

Tom Marcinkowski and Bob Petty presenting their group's discussion points

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Program evaluation is the localized, quality control department of the research world.

- What is "appropriate" use of technology? What are the issues of age appropriateness, optimal curriculum?

What is and What Should Be

When a field is well defined and established, research - coupled with practical experience - can drive the practice of a discipline. Standards of practice - at least in the form of minimum standards - are determined by research findings. The research agenda for many fields tends to establish the core elements of the practitioner's model - what it takes to constitute an 'intervention,' to use research terminology. In fields such as clinical psychology, the scientist practitioner approach calls for each program to act as a mini research case study. The psychologist is encouraged to actively pursue a research agenda - collecting data via systematic observation - while practicing the trade. In environmental education, the front-line educators or interpreters often don't feel they have the time or expertise to formally advance research in the field. The questions that they have, though directly related to those of researchers in the field, are driven by their desire to maintain or improve their own programming or maximize their efficiency at delivering the educational or interpretive product.

Both research and evaluation generate knowledge. What kind of knowledge, the depth of that knowledge, and the intended used of that knowledge can differ tremendously.

Program evaluation is the localized, quality control department of the research world. It has inherited the classical forms of research terminology - 'dosage' refers to the length of a program; 'side effects' of programming include the risks to participants; and 'treatment fidelity' or purity refers to the models that we use in our approach to programming: are our environmental education programs place-based or issue-based? Do we rely solely on hands-on activities in the outdoors, or do virtual activities augment our program? Do we structure our program as part of a long-term set of activities for participants or is it a stand-alone experience? How we structure our programming depends on a lot of factors, not the least of which is practical experience as to 'what works' and the demand that our clients express for particular services. Evaluation can connect those driving forces to the environmental education theory and research that supports various approaches to programming. Ideally then, program evaluation functions in a quality enhancement capacity. Research in the many disciplines that inform environmental education - social psychology, teaching and learning, science education, and adult education - informs us as to the foundational guidelines for programming.

Although there is some discussion as to how well developed these functional guidelines are, they exist. In environmental education, these guidelines may only refer to safety standards and minimum competencies - and as long as they are viewed as minimums and don't become the guiding force in what we do, we have room for the quality enhancement that evaluation offers. Whether specific programs are framed by intrinsic arguments or carefully crafted from the standards, there is room for program improvement via evaluation linked to recent and relevant research. The National Park Service has taken a step beyond the minimum standards approach with their guidelines for interpreters. This set of documents uses a common language to bridge interpretation and education in the Park Service and describe what it is that interpreters do and what it looks like when it is done well. Other documents exist that guide the environmental education and interpretive professions (see recommended readings, Appendix B).

Evaluation and research differ in scope and purpose. Evaluation is setting specific, and often has less depth and generalizability in its instrumentation. Evaluators may use instruments with shallow and specific characteristics, to answer specific questions rather than track underlying trends. It is a part of the research agenda to collect data that are more profound and generalizable across programs. As described earlier, evaluation is primarily done for making decisions about a program. The use of research findings, however, is typically more

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focused on fundamental judgments and/or decisions regarding the value or worth of the program or model being tested. These differences may be subtle in the case of large-scale evaluations where findings are published and shared to inform similar programs; however the differences in purpose between evaluation and research most often mean that they ask different questions which indicate different methods and produce different findings. Both generate knowledge. Of that there is no question. What kind of knowledge, the depth of that knowledge, and the intended uses of that knowledge can differ tremendously.

The Politics of Evaluation

Evaluation generates knowledge, and knowledge is power. And, perhaps more important to agencies with an educational mission, money follows power. It is important to recognize and acknowledge these facts. Whoever determines the evaluation questions and agendas holds the key to what information will be gathered. On a program by program basis, these decisions can impact large numbers of educators, administrators, funders, and clients or visitors. Across the environmental education and interpretation fields, these evaluation questions (often mixed with research questions) are driving the goals and objectives of practice.

Although participatory evaluation and stakeholder-based approaches put the decision making power in the hands of those affected by the evaluation, evaluators hold the key to making an evaluation happen. They establish the evaluation protocol and determine whether a participatory process will or will not occur. They offer the menu of approaches, techniques, theories, and methodologies. They often collect the data and they write the evaluation reports.

Formalizing the profession of evaluation, or any profession, invites standards of practice, ethical guidelines, and often results in the credentialing of practitioners. Credentialing or licensure is one way to acknowledge, and legitimize, the power that comes with the responsibilities of working within a profession. This final step has yet to completely take place in both the fields of evaluation and nonformal environmental education. However, there are current discussions among members of the professional organizations regarding the need for and the requirements of installing a certification process. In 1998, the National Association for Interpretation introduced its certification program for heritage interpretation, and has three other categories for certification as well. The American Evaluation Association, although it does not certify professional evaluators, endorses a training program and offers many professional development opportunities. These concepts - credentialing, licensure, certification - may not be necessary for quality programming, but they shape a field's common language, help define what it is that we do, and help us explain our professions to others.

What Environmental Education Evaluation Can Look Like

The Summit was organized and partially funded by two primary partners in an ongoing environmental education collaborative. Emmalou Norland directed the evaluation of the project that was managed by Julia Washburn of the National Park Foundation. The two of them were asked to discuss their project in terms of the lessons they have learned and paths they have traveled in coordinating the evaluation of a very large and complicated environmental education grant.

The Parks As Resources for Knowledge in Science (P.A.R.K.S.) program is a nationwide environmental education grant managed by the National Park Foundation and funded by the ExxonMobil Corporation. Thirty-six National

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Evaluation is not political when it meets the following criteria:

- *No one knows about it*
- *No one cares about it*
- *There is no money at stake*
- *There is no power at stake*
- *No one is making any decisions based on it*
- *No one participates in it*

Michael Patton

Emmalou Norland and Michael Patton find a few moments to ponder the day's topics

Park sites were chosen to receive funding to infuse the National Science Education Standards (NSES) into new or existing park programming for school groups. The National Park Foundation partnered with the National Science Teachers Association (NSTA) and the Ohio State University, while individual park sites formed local partnerships with schools and other community organizations. Each local P.A.R.K.S. team created a project plan that focused on using their park resources and serving local school groups by incorporating the NSES into the park curricula. Although the audience for P.A.R.K.S. programs rests firmly in the realm of formal education (school groups across the country), the projects' settings were typically nonformal (that is, National Park sites) with a few programs conducted in the school classrooms.

Program topics ranged from rice farming in South Carolina, geology in California, water quality in Texas, Lewis and Clark's expedition in Oregon, to marine studies in Alaska. Program participants were also quite diverse: some programs served elementary students, some middle schoolers, some high school students, and some programs were directed toward teachers themselves. With the wide range of program foci, locations, and participant ages, the P.A.R.K.S. program evaluation was quite large in scope. At the local level, for example, projects could benefit from the incorporation of formative evaluation into their program. With that in mind, parks were encouraged to form stakeholder groups representing their local partnerships and those with an interest in the outcomes of their P.A.R.K.S. program. Three regional workshops were held early in the grant period in order to familiarize the 36 teams with the NSES as well as evaluation processes that could be incorporated into their program planning. The workshops were conducted by NSTA and the Ohio State University evaluation team.

On a national level, a summative evaluation was needed in order to meet the needs and questions of the P.A.R.K.S. grant partners. In order to keep the focus of the evaluation on the *overall* program, a cluster evaluation format was chosen. Data would be collected from the individual park projects, but all analysis and reporting would be aggregated.

A stakeholder-based evaluation approach was implemented in which representatives from the National Park Foundation, ExxonMobil, the National Park Service, and NSTA were selected to participate in crafting the questions that the evaluation would address. Data collection consisted of site visits to the each of the park sites during which the local park-teacher teams were interviewed, programs were observed, and the park resources (physical and cultural contexts) were assessed. Additionally, questionnaires were sent to the teachers and students who participated in the parks' programs.

With such a large project and many individual parks creating their own evaluation plans for program improvement, the road was not always smooth during the course of the grant period. The evaluations (both local and national) had to be adaptive and reactive to the inevitable changes in program plans, hold-ups in implementation, and other snags as the parks began their work.

P.A.R.K.S. as a Model

So, what aspects of the P.A.R.K.S. program evaluation can be modeled effectively by other nonformal environmental educators? There are several identifiable strengths in the P.AR.K.S. program and evaluation approach. First, the required collaboration on both the local and national level was an integral part of the initial vision of the P.A.R.K.S. grant. Collaboration among multiple partners contributing to a project often improves the chances for that project's sustainability beyond the life of the grant. In order to determine if that is the case with the P.A.R.K.S. grant, the national evaluation team researched organizational collaboration and measured the extent and quality of the local teams'

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collaborative efforts. This approach to measuring the variables that answer stakeholders' evaluation questions is the second strength of the P.A.R.K.S. evaluation. Grounding the approach to measuring such variables as collaboration and stewardship in the relevant current research literature allows this project to further the knowledge in these fields of inquiry while gathering information that is useful to the stakeholders as well.

Another strength of the P.A.R.K.S. program is its flexibility. From the beginning of the grant's implementation, the evaluation plan changed and grew to account for the changing characteristics and needs of the stakeholders. Some National Park educators transferred to other parks, a budget cut removed some team teachers from their jobs, a drought prevented the renovated rice fields from maintaining the proper water level, and on the national level Exxon merged with Mobil and the funder representative to the stakeholder team was replaced. Fortunately, recognizing inevitability of change over course of grant was a lesson that was quickly learned. The national partners were open to creative solutions to handling unexpected changes at all levels of the project. Adaptive, reactive evaluation management is key to making sure that the evaluation continues to yield useful, relevant information for those who need it - even when those people are not the same who started with the project.

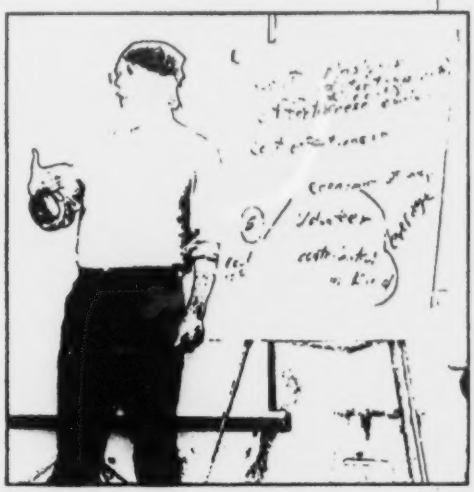
The final key to the success of the P.A.R.K.S. project evaluation is that from the initial phases of planning the project, money was designated for the evaluation. With the P.A.R.K.S project, both Exxon and the National Park Foundation recognized the benefits of funding a national evaluation of their program, and they incorporated a formal evaluation component into the grant from the beginning. Other funders of environmental education in both formal and nonformal settings are asking for evaluation plans in all of their program proposals. Funders have a vested interest in seeing sustainable programs, and evaluation can help programs succeed by redirecting efforts in an evolving manner.

As the National Park Foundation and the Ohio State University have both learned, another necessity for effective evaluation is building in enough time. When attempting to put in place the capacity for ongoing program evaluation, one must recognize that it takes time to evaluate. Evaluation does not just happen on the side. Environmental educators need to set aside time to address their evaluation questions, meet with stakeholders if that is their preferred approach, and plan their data collection.

The P.A.R.K.S. model for successful evaluation:

1) *Build in time and money for evaluation*
2) *Adapt and react - plan to change the plan*
3) *Recognize opportunities to connect evaluation to research*
4) *Encourage collaboration and other opportunities for sustaining the program*

Michael Patton presenting on cost-effectiveness



Valuing Programs from an Economic Perspective: Cost Analysis in Environmental Education Evaluation

Although evaluators typically are not trained in cost analysis, those requesting and/or funding an evaluation often call for this skill. The costs associated with environmental education programs and the benefits those programs provide to participants, local communities, or society in general are

often key variables in a formal evaluation. The way in which this cost analysis is approached can have dramatic effects on the results. Therefore, it is important to conceptualize carefully the role of cost analysis in program evaluation.

Cost analysis links dollars to numbers of participants or instructors or other line items in the list of program components. Understanding the environmental education program, its context, and seeing the program inputs and outcomes as they relate to each other can be key in uncovering true program costs and effectiveness. As mentioned before, the process of linking program inputs to outcomes though logic modeling can aid in seeing the overall picture of a program. It also can aid in identifying the discrete components of a program - a process necessary in order to begin analyzing program costs. In the end, cost analysis is the process of translating a program's budget into a program-based language.

Cost-benefit and Cost-effectiveness:

As professionals in the field of environmental education program evaluation, we are interested in more than just the costs of different programs - we also need to account for the outcomes, or benefits of our programs. Cost-benefit analysis brings in the outcome evaluation orientation and begins to link dollars to the outcomes of programming, not just to program activities or inputs. Cost-benefit analysis assigns monetary value to all components of a program - inputs, outputs, outcomes, and societal impacts. By taking the varying pieces of a program and reducing them to dollar terms, the process works particularly well when considering programs with widely varying outcomes that would otherwise be difficult to compare.

The cost-benefit analysis of a program requires that a program be broken down into its constituent parts, and can work quite effectively with the logic modeling process described earlier. Cost-benefit analysis uses data and current research to link evident program outcomes to the longer-term societal benefits that are harder to measure. When looking to justify the field of nonformal environmental education, cost-benefit analysis can put environmental education program outcomes in terms more easily compared to those of other social programs.

Cost-benefit analysis assigns monetary value to all components of a program.

Another form of analyzing costs and program outcomes is cost-effectiveness analysis. This process is inherently comparative and is often more appropriate when the alternative program choices being considered are not drastically different. For instance, the decision may be choosing between an outdoor wilderness program that incorporates a ropes course versus one that uses science fieldwork instead. The desired outcomes may be similar enough among a particular agency's programming options that effectiveness analysis is more appropriate. Unlike, cost-benefit analysis, cost-effectiveness analysis does not convert program outcomes to dollar figures. Although the process still renders a ratio of cost to benefit, the benefit, or effectiveness, quotient is thought of in terms that are more inherent to its nature. If the desired outcome of a program is that participants go on to finish high school or to major in science in a post-secondary program, measures of this outcome (number of graduates per program, etc.) may be the simplest way to compare the program alternatives.

Cost-effectiveness analysis may be more appropriate when comparing similar programs.

The cost-effectiveness approach will typically be the easier and more accurate approach when environmental education programmers are trying to make decisions regarding alternative approaches or methods in their programs. In environmental education programming we are often looking at program alternatives that are quite similar. Additionally, environmental education programs often aspire to societal or environmental impacts that are difficult to characterize in terms of dollar value. Cost-effectiveness analysis addresses these difficulties by generalizing the costs of program inputs and outcomes over time.

It must be a researched process - not a guess. The process of cost-effectiveness analysis requires the use of existing research data to assign value to program outcomes.

The process of cost effectiveness and cost benefit analysis is inherently comparative and results in a decision-making process that has a long history in politics and business. Program A and program B are compared both in terms of cost and benefit (see Figure 2). Typically a clear advantage on both scales is not the case for one program. More often, a program will rank highly on one scale and lower on the other, making the choice less obvious. In this case, cost effectiveness analysis can clarify the options. If program A costs more than B, and it appears that program A accomplishes more of its desired outcomes, one must analyze the effectiveness of the programs further. Instead of deferring to the cost argument (in which program B would be 'less expensive', research on the societal value placed on the programs' outcomes and impacts can be employed. A dollar value can be extrapolated from logically connected program outcomes and impacts. These outcomes and impacts can then be more carefully scrutinized to determine which program is the better value.

Figure 2: Cost-Effectiveness Analysis

Effectiveness / Cost	A > B	A = B	A < B
A > B	?	Choose B	**CHOOSE B**
A = B	Choose A	Either	Choose B
A < B	**CHOOSE A**	Choose A	?

Other Factors when Considering Costs:

With respect to program inputs, cost-benefit and cost-effectiveness analysis can bring out the value of a program's resources - a process that is complicated by the variety of less apparent resources involved in many environmental education programs. In addition to the real costs associated with things like supplies or travel, in-kind contributions such as operating costs or time contributed by volunteers often undergird larger programs. These resources are critical to the success of any environmental education program - in experiential or wilderness programs, the value of the land set aside for program use is another additional resource. These resources can serve to leverage funding, and a program's sustainability may rely heavily on the understanding of these less apparent resources that are not easily documented in line-item budgets.

In order to ascertain the costs associated with any program, care must be taken to break down that analysis into those costs associated with the start-up of a program, the core costs needed to maintain the program, and the costs of the 'bells and whistles' that enhance programming. Start-up costs, of course, inflate the overall program budget and when identified as such can be reallocated in future budgeting. Carefully and accurately identifying the core elements of a program can be critical when an evaluation is helping practitioners to make decisions about the sustainability of a program. In addition, understanding the core of one's program helps to insure against stripping those elements in the name of cost-saving or sustainability at a later date.

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Carefully and accurately identifying the core elements of a program can be critical when an evaluation is helping practitioners to make decisions about the sustainability of a program.

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Additionally, determining if there is an economy of scale, in which the cost of an individual program decreases each time that program is given, is imperative in understanding the costs associated with changing the program or modeling it elsewhere. Finally, those costs identified as 'unusual' or stemming from unexpected crises are often factored out of the core program budget reports. However, particularly if they are repeated across projects or budget cycles, unusual costs must be monitored, estimated, and accounted for in a cost analysis. In other words, we must learn to expect the unexpected costs.

Should Environmental Education Program Evaluation be Required?

More and more funding agencies, in an effort to encourage effective programming, are mandating program evaluation in their funded proposals. Grantees are being required to include evaluation components as a part of their program plan in order to obtain funding for the program itself. Obviously, incorporating the evaluation piece affects the cost of programming. Program leaders often want to understand how they can justify the cost of formal program evaluation. A very general rule regarding funding environmental education evaluations encourages that 10 to 15% of the total project budget be devoted to its evaluation.

In situations such as the P.A.R.K.S. project discussed earlier, where the funder recognizes the additional expense that evaluation entails and the program leaders are interested in and enthusiastic about the evaluation, this model can produce successful programs. However, forcing program evaluation on environmental education programs can cause problems. In some cases, where the evaluation is not fully appreciated by the programmers, its implementation can interfere with the program itself. Additionally, if the program leaders are not interested, the possibility of them using the results of the evaluation is considerably diminished. The issue of mandated evaluation components in environmental education programs should be carefully considered, and quite possibly program evaluation will best serve those who are more ready and willing to welcome it into their programs.

Wildlife watching: Cindy Somers, Stephanie Pittard, and Kate Wiltz

Possibilities: Where Do We Go From Here?

In the corporate sector, organizations have research and development (R & D) arms that allow companies to continually improve their products and meet consumer needs and expectations. R & D departments incorporate marketing and production research with the specific theoretical and science-based research regarding the products that they create. The entire process of product design, production, distribution, marketing, and consumer use and satisfaction is evaluated, and the information gathered is used to improve this process. Corporate R & D basically consists of targeted research performed on very specific subjects that will inform decision-making within the organization.

Sound familiar? The nonprofit world does not have a formalized R & D sector; but we do have formal evaluation that serves the same purpose for our programs. Program evaluation is the research and development arm of nonprofit and governmental educational programming. It is tailored to a particular program or agency and is designed to aid in informed decision-making for program improvement or continuation. When thought of in this way, the importance of program evaluation begins to emerge. Its role as a natural step in program development and implementation in nonformal environmental education becomes clear.

At the end of the journey to the Summit, we find that nonformal environmental education needs effective, useful evaluation in order to enable the field to grow and develop in our changing society. Program evaluation must be adaptable to the demands of outdoor, experiential education with affective outcomes and longer-term goals associated with relatively brief program 'dosages.' Most importantly, we find that the process of sharing what has worked, what didn't, and how to use evaluation information is perhaps the key to improving nonformal environmental education. Communication among practitioners, funders, and the academicians working in environmental education is imperative to creating programs that meet the needs of the target audiences while designing evaluations that meet the needs of those involved in programming. Following are some ideas, suggested by the participants at the Teton Summit, for fostering such communication.

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Program evaluation is the research and development arm of nonprofit and governmental educational programming. It is tailored to a particular program or agency and is designed to aid in informed decision-making for program improvement or continuation.

A first step is the *creation of affinity groups that sponsor environmental education evaluation* training opportunities and organize events and presentations at national conferences in both nonformal environmental education and program evaluation. Venues for activities include the professional associations of which many of the participants are members: the North American Association for Environmental Education, the National Association for Interpretation, the Visitor Studies Association, the Association of Nature Center Administrators, and the American Evaluation Association. The Environmental Program Evaluation Topical Interest Group of the American Evaluation Association, begun in 2000, is an example of such an affinity group.

In order to reach a broader audience with evaluation information, any training workshops delivered to nonformal environmental educators should be designed from a multi-level, multi-focus approach in which educators can easily obtain information that is relevant to their content area and program type. The *creation of a guidebook or set of guidebooks* may be the best way to encapsulate the information in an organized and useful way for nonformal educators. Such a handbook might consist of:

- A list of environmental education outcomes
- A current research agenda for environmental education
- Better practices for environmental education evaluation
- A 'how to' section for including evaluation in environmental education programs, including consultation information and contacts for professional evaluators
- A cross-referenced list of resources on program evaluation for environmental education and nonformal environmental education
- A collection of lessons learned from evaluations in nonformal environmental education settings
- Examples of quantitative and qualitative evaluation instruments that have been utilized in nonformal environmental education settings, including sample permission forms, cover letters, questionnaire packets and incentives

Of course, this information can be compiled and shared in ways other than the publication of a guidebook. Simply by incorporating the funders and practitioners in nonformal environmental education into the processes traditionally reserved for academia, the information gap between theory and practice can be bridged in both the evaluation and environmental education fields. Program leaders who are developing evaluation components can utilize *peer review for feedback on their program evaluation*. Other environmental educators and program funders, as well as researchers can review instruments or act as stakeholders to the evaluation team. Alternatively, those who conduct programs can play a role in forwarding research projects in the environmental education field through a similar process of reviewing research proposals and article submissions. Ideally the overall goals for each group are the same: better practice of nonformal environmental education. The lines between theory and

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practice are often blurred and somewhat arbitrary. A stronger front can be presented in advancing the field of nonformal environmental education evaluation when practitioners, researchers, and funders mutually support its growth.

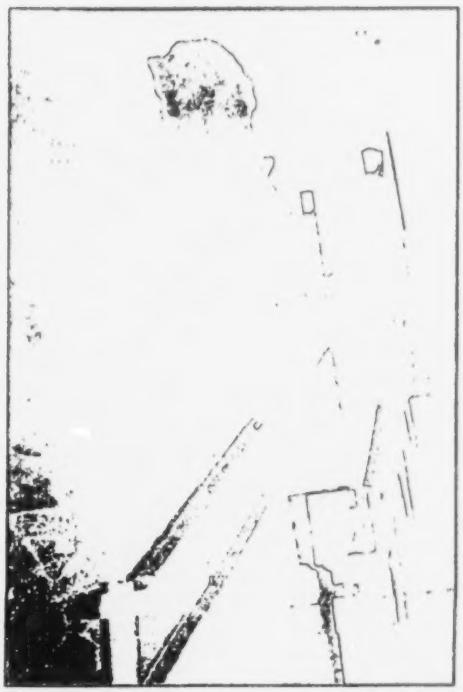
A field trip

As one approaches the National Museum of Wildlife Art along the road north of Jackson, only subtle changes in the landscape seem to hint at the museum's presence. From a distance, the charred remains of log poles can be seen, erected straight and tall, against the sage covered hillside. These sentinels draw the eye upward, and slowly from the geometric outcroppings, the shape of the museum building emerges.

The aboveground entrance to this facility embedded in the hillside draws the visitor from a balcony down a staircase enclosed like the walls of a tight canyon. At the first turn, a magnificent and larger-than-life-sized bronze sculpture of a cougar captivates in its predatory pose. Immediately, the tone is set - awe and respect for those more powerful than we, with an undertone of foreboding.

At the bottom of the stairs one finds oneself in an atrium overlooking the National Elk Refuge across the highway. In stark contrast to the recent descent, the ambiance is one of crisp clean distillation of nature's energy and power. Natural light highlights the textures of the stone façade of the walls. Animal tracks emerge from the sandy, distressed sheet-rocked floors. As one looks back up the stairs just descended, the dark puma peers down from the perch with muscles taught and ready to pounce. The hardiest of visitors responds to the gentle push and embarks on the exploration of the galleries.

National Museum of Wildlife Art



Part Two: Summit Take-Aways

Through the course of the conversations at the Teton Summit, several themes emerged. As participants explored the topics related to environmental education program evaluation, particular messages were repeated. These themes, or 'take aways' are described here for the purpose of summarizing and touching on a few of the more prevalent issues that fed the discussions at the Summit. Hopefully, these motifs will be revisited and will continue to be fleshed out as the exploration of nonformal environmental education program evaluation continues.

The four primary take-aways from the Teton Summit were:

1. The importance of carefully matching evaluation approaches to individual programs
2. Understanding the relationship between evaluation and research in environmental education
3. The need to infuse evaluation thinking into our environmental education programming
4. Taking time to accurately and carefully identify what the 'it' is that we are evaluating

Matching

The first, and most prevalent, theme from the Summit discussions was that of 'matching.' Each program, even within a single field such as nonformal environmental education, has a unique context. That is, the host of variables that created the need for a program and that program's niche in the environmental education community create the setting for that program and affect every aspect of the program design and implementation. These same factors also define the evaluation methods and approaches that are most compatible with and effective for collecting evaluation information about that program. It is often not feasible to design pre and post tests for the adult participants at a weekend birding retreat. Adult learners may not appreciate the intrusion of formal testing in a nonformal atmosphere. Similarly, a program designed for school children may not include an appropriate amount of time for testing knowledge before and after the learning experience. Other, less intrusive measures may be necessary for the evaluator wanting to assess learning in program participants.

Another equally guiding force in the evaluation of programs, stems from the underlying purpose of program evaluation. The reasons why one evaluates are many, and the varied paths that programmers take to the evaluation precipice bring them to a common point: program evaluation is conducted in order to provide the information necessary to make decisions. This desired information and the intended uses of the evaluation data drive all of the other elements in the evaluative picture. Program evaluation can take many forms, depending on the nature of that needed information.

Good program evaluation does not prescribe a particular research design. It does not imply a particular, detailed set of methods. Good program evaluation does look at a program with 'new glasses.' It does seek out the best way to provide the needed information to the stakeholders in the process. However, how does one define 'best?' The criteria for evaluation indicate that the data collected are to be useful. These criteria also state that the data should be

Good program evaluation looks at a program with 'new glasses.' It seeks out the best way to provide the needed information to the stakeholders in the process.

accurate. Michael Patton indicated that these criteria, as well as those of propriety and feasibility, are both important; however, utility is the first of the evaluation criteria and accuracy is commonly listed last. The implied caution for program evaluators is not to fall on the sword of sound (methodological) research. While not disregarding accuracy, evaluators must place first the need to provide useful information and facilitate the use of those data. Good program evaluation will not be judged by how large the sample was or where the results are published as is the case with most research. Good evaluation will provide data that are useful to and used by the stakeholders in the evaluation process.

In the mix of matching methods, quantitative and qualitative, to programs of all types, issues of validity and reliability (accuracy) cannot be ignored of course. Methods tailored to a particular environmental education program will also require validation. An evaluator cannot determine that the program has increased learning in the participants based on how many students expressed enthusiasm or smiled during the program. However, the process of seeking a previously developed research instrument with established validity and reliability may not be the answer either. Validation in evaluation may sometimes be likened to the criteria for validity described by Lincoln and Guba (in Denzin and Lincoln, 1994) for qualitative research. Program evaluators can (and should with quantitative measures) test their instruments for validity and reliability, but the ultimate test comes through ground-truthing the methods. The methods used to gather evaluation information must ultimately make sense to those who need to use the data collected. Using a stakeholder group to determine if the questions being asked in an evaluation will gather the information needed ultimately grounds and validates much of the evaluation methodology. This process, in addition to using multiple methods, will allow the statements one bases on evaluation data to be placed in the context unique to the program being evaluated.

Overall, the evaluator must keep an eye on the intended use of the evaluation information throughout the evaluation process. By allowing the evaluation questions and the program context to guide his or her methodology, the evaluation can render useful information. Finally, the evaluator can then ensure that the evaluation information is used by actively facilitating its use by the stakeholders in the process.

Evaluation and Research

The second theme from the Teton Summit, reminds us that research and evaluation can form a happy partnership. Each serves a different purpose, but they are related in many ways and compliment each other in practice. While research and evaluation often deal with similar issues, it is important to remember that we are not called on to answer pressing research questions with every evaluation. At the same time there are important implications to performing an evaluation without the benefit of relevant research in nonformal environmental education.

Evaluation is inherently comparative. The issue is: to what are we comparing our program? If you do not include multiple stakeholders, each representing different perspectives, an evaluation can lose sight of its larger context: its setting within the field of environmental education. Gathering data that are useful to the program stakeholders who will be making decisions based on them is the guiding purpose of program evaluation, as mentioned above. However, the value of stakeholders in an evaluation hinges on the triangulation of perspectives and insight that accompanies the diverse representation in a stakeholder group. Even with a funder, a program administrator, a front-line educator or interpreter, a community representative, an agency board member, and a prospective participant on your stakeholder group, a program, and its evaluation, could still remain quite isolated from the larger field of environmental education. It is

nearsighted of environmental education agencies to forget that often their evaluation questions relate directly to the research questions driving the field of nonformal environmental education. Ultimate utility can be best served if the evaluation has ties to the research in environmental education.

One way to address this issue is to consider the larger field of environmental education as one of the stakeholders in the program evaluation. This does not imply that a researcher in environmental education must be asked to formally participate in the evaluation. The evaluation team can keep a close eye on the emerging literature in the field. Allowing trends in environmental education to inform our evaluation questions keeps us in touch with alternative approaches and prevents a reinventing of the wheel with each program and evaluation. Keeping evaluation connected to the field of environmental education does not imply that the data from a program's evaluation are generalizable to the field; however, it does allow for the possibility that the utility of the data to each stakeholder includes a utility broader than the individual program. In this way, evaluation can inform the field of environmental education and research in the field can inform individual evaluations. A true learning organization will strive to build this type of feedback into all of its programming, and hence its program evaluation.

Allowing trends in environmental education to inform our evaluation questions keeps us in touch with alternative approaches and prevents a reinventing of the wheel with each program and evaluation.

To point out the relevance of this feedback in nonformal environmental education, consider the history of environmental education. Throughout the early part of the 20th century, different movements emerged, grew philosophically, and informed what was ultimately to become environmental education as outlined by several sources in the 1960's and 70's and in use today. Interpretation and nature guiding, outdoor education, nature study, experiential education, and the conservation education movement all contributed to the field of environmental education. The environmental education institutions, their missions, and programs today encompass the philosophies of each of these movements to a greater or lesser extent. Evaluations informed primarily by internally derived criteria can be isolated from the broader goals and objectives of the field of environmental education. Neglecting research and established trends outside an organization's mission and historical context can foster evaluations - and programs - that lack connections to the broader field of environmental education. Therefore, it may be important for program leaders to consider the implications of how evaluation criteria are chosen for their programs.

Debbie Brainerd, Sue McGuire, and Lyn Fleming in group discussion

A good marriage has strong ties between its partners. They learn and grow from each other, while recognizing and appreciating their different roles. Evaluation and research, both as disciplines and as individual projects, should inform each other through a familiarity with each other's priorities and findings in the field of nonformal environmental education.

A Culture of Evaluation

Another idea that repeatedly arose at the Summit was that of infusing evaluation into the environmental education organization and its programming. In order to create an environment of ongoing program development, implementation, and evaluation, two things are necessary. First, the environmental education and interpretive staff must work to develop a culture of reflective practice. Second, they must foster this environment by building formal evaluation capacity in their organization.

In nonformal education, reflection on what has 'worked' and what hasn't and the active incorporation of this information into programming is often already in place on an individual basis. The educator in a nonformal environment has historically relied on this informal evaluation in the absence of the formal assessment afforded by the classrooms of formal educators. However,

developing an enriching atmosphere in which this process is shared among staff requires that this process be recognized, valued, and encouraged. Reflective practice refers to the incorporation of this evaluation thinking into daily programming, as well as remembering to step back from the program and take time to see the big picture. This process is similar to what formal program evaluation offers to environmental education programs. Formal evaluation incorporates time for reflection and discussion among stakeholders as to what information is needed to make decisions about programming. Formal evaluation insures that data collection does not interfere with programming, and then allows more time for reflection and use of the evaluation results.

Allowing a reflective and learning-oriented culture to grow within the environmental education organization and become formalized will ultimately permit mutually reinforcing evaluations and lead to organizational learning and growth.

An organization in which staff are aware of the informal ways they collect data each day in their programs and in which they discuss how to incorporate their observations into program improvement or development has a culture of reflective practice. By formalizing some of these elements of good programming, the organization can begin to build its capacity for using formal program evaluation. This process involves building on and fostering the informal evaluation practices already employed by education staff. As an organization develops and grows, it can foster learning about evaluation approaches and alternatives, and begin to incorporate the language, concepts, and skills of program evaluation. This learning process can bring uniformity across the organization and allows for better communication of program successes and failures.

Whether the environmental education organization then decides to conduct an evaluation of their program using a member of their own staff or contract with an outside evaluator, the organization's staff will be better equipped to participate in and use the results of an evaluation if time has been devoted to understanding and valuing the information that is readily available from their programming. Although this process can be frustrating and challenging, allowing a reflective and learning-oriented culture to grow within the environmental education organization and become formalized will ultimately permit mutually reinforcing evaluations and lead to organizational learning and growth.

Michael Patton presenting some common evaluation vocabulary

Identifying the 'It' in Evaluation

The fourth and final Summit take-away emerged when the Summit participants joined a group of teachers who were attending a workshop on the *Journeys* curriculum. *Journeys* is a place-based curriculum for K-12 classrooms and was developed by the Teton Science School. As part of the program, graduate students at the Teton Science School visit classrooms to help teachers incorporate the activities into their curriculum.

During the joint session, the Summit participants and *Journeys* teachers discussed program evaluation in the context of the formal classroom and the *Journeys* curriculum. As the teachers and TSS staff described their program, a key evaluation issue emerged: the importance of accurately and specifically identifying what it is that we are evaluating. How does an evaluator identify the qualities that distinguish this program from all others? Programs such as Journeys, that are taking place in disparate classrooms and are implemented by many different teachers, manifest themselves in unique ways at each site and often change over time as well. When looking at a program to determine its 'effectiveness,' what aspects of the program does the evaluator examine?

The core elements that define the program must be clearly identified prior to a program evaluation. When using a stakeholder group, the evaluator can elicit a discrete list of core elements from those closest to the program. In a sense, the evaluator facilitates a common definition of what the program should look like when successfully implemented. With the *Journeys* program, this described both the pieces of a complete *Journeys* program and characteristics of

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a successful *Journeys* teacher. Care must be taken to identify what exactly is central to a program for its success. What are the essential goals and desired outcomes for a program? What characteristics must be apparent in a program for these goals to be achieved? With the *Journeys* program, teachers indicated that parental buy-in to the program activities was an important part of the core of the Journeys program. This core element is not directly related to a goal or description of the curriculum implementation; however, through discussing what was working and what wasn't in the field, the stakeholders to the program identified a core piece to the program's potential success.

The core elements that define the program must be clearly identified prior to the evaluation of that program.

Although lists could be made of all of the important elements of a successful program, the tendency for many program stakeholders is to want the evaluation to render an effectiveness rating of some sort - a map by which to measure in concrete terms whether or not a particular manifestation of the program or curriculum is successful. One part of identifying core elements of a program is understanding that not all programs will have all elements. The power of program evaluation lies in its ability to offer a menu of ways of thinking about or looking at effectiveness. For instance, the concept of care-taking arose in the *Journeys* discussion. Student stewardship may be an implicit goal of the *Journeys* curriculum and it was achieved by a few teachers who had been working with the program for a few years and had expanded it to include community litter pick-ups. A noticeable awareness in the students about littering in their community was evident, according to one teacher. Does care-taking or stewardship then become a core element? Certainly it is desired outcome of the program, but is a program ineffective if there is no evidence of student stewardship? Program evaluation can provide evidence of each of the measurable objectives that stakeholders identify as important to the program's implementation and success. Then these elements can be combined and analyzed to explore program effectiveness defined in a number of ways. A local program in its first year of implementation may not be ready to be measured against student stewardship as an outcome. The stakeholders and evaluator can work together to appropriately match measures and core elements to program manifestations. The first, and perhaps most important, step in evaluating any program is identifying and describing those core elements.

As the Teton Summit came to a close, the participants had a lot to think about. In the months following that weekend retreat, I have reviewed the discussions that took place, spoken with some of the participants, and solicited input as to what was most meaningful in the Summit experience. I hope to have touched on the primary issues, and in some way I hope that each of the participants can see a part of their experience in this document. The Summit Take-Aways could go on for much longer, but in narrowing to four general themes, I believe the spirit of the Summit discussion is captured. Hopefully, those who take the time to read this document - or at least peruse its pages - will find some kernel of information relevant to their cause. Perhaps these pages will be a source of inspiration for future conversations about how to educate and evaluate in a more enlightened and informed manner.

The Teton Summit Group:
Row 3: John Hayes, Jim Akers, Patti Reilly, Court Smith, Sue Perin, Brian Windrope, Bob Petty, Joe Heimlich, Tom Marcinkowski, Janet Ady, Thane Maynard, Stephanie Pittard, Phills Ault, Michael Patton, Liz Hall, Mark Everson, Joe Jones
Row 2: Annie Jack, Sue McGuire, Jack Shea, Emmalou Norland, Debbie Brainerd, Terry McLaughlin, Gina Zwerling
Row 1: Cindy Somers, Marcella Wells, Kate Wiltz, Judith Stockdale, Julia and Ruby Washburn

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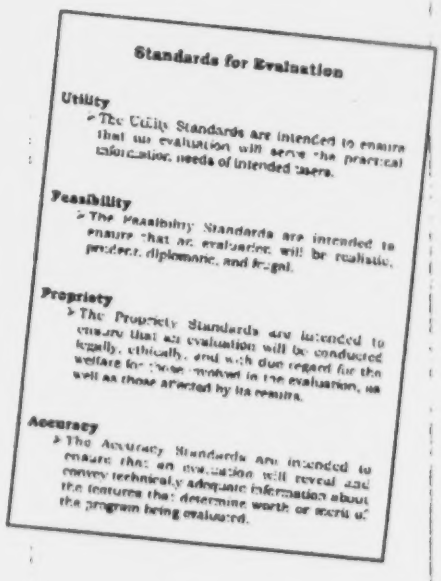
Appendix 1: Summit Participants

Janet Ady	US Fish and Wildlife Service
Jim Akers, PhD	Utah State University
Philis Ault	North West Regional Education Laboratory
Rich Bloom	Teton Science School
Debbi Brainerd	Puget Sound Environmental Learning Center
Kathryn Davis Grohusky	Keystone Science School
Mark Everson	Utah State University
Claudia Figueiredo	Ohio State University
Lynette Fleming, PhD	Evaluation Consultant
Elizabeth Hall	Ohio State University
John Hayes	Utah State University
Joe Heimlich, PhD	Ohio State University
Joseph Jones	Oregon Museum of Science & Industry
Jane Lavino	National Museum of Wildlife Art
Tom Marcinkowski, PhD	Florida Institute of Technology
Thane Maynard	Puget Sound Environmental Learning Center
Sue McGuire	Teton Science School
Terry McLaughlin	Puget Sound Environmental Learning Center
Emmalou Norland, PhD	Ohio State University
Elaine Patridge	Antioch University
Michael Patton, PhD	Utilization-Focused Evaluation
Sue Perin	Teton Science School
Ellen Petrick-Underwood	Yellowstone National Park
Bob Petty	Montana Audubon Society
Stephanie Pittard	National Park Foundation
Patti Reilly	National Park Service
Jack Shea	Teton Science School
Court Smith	Teton Science School
Cindy Somers	Ohio State University
Judith Stockdale	The Gaylord and Dorothy Donnelley Foundation
Karla VanderZanden	Canyonlands Field Institute

Julia Washburn	National Park Foundation
Marcella Wells	Colorado State University
Kate Wiltz	Ohio State University
Brian Windrope	Yosemite National Institutes
Gina Zwerling	Ohio State University

Appendix 2: Materials from the Summit


Standards for Evaluation

Utility
- The Utility Standards are intended to ensure that an evaluation will serve the practical information needs of intended users.

Feasibility
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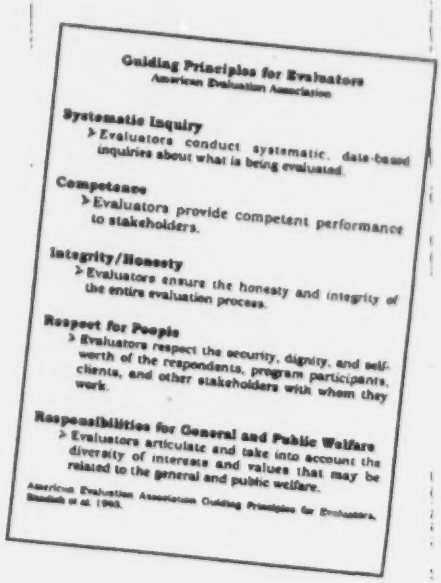
Joint Committee on Standards for Educational Evaluation, *Saunders* chair,1994


Guiding Principles for Evaluators
American Evaluation Association

Systematic Inquiry
- Evaluators conduct systematic, data-based inquiries about what is being evaluated.

Competence
- Evaluators provide competent performance to stakeholders.

Integrity/Honesty
- Evaluators ensure the honesty and integrity of the entire evaluation process.

Respect for People
- Evaluators respect the security, dignity, and self-worth of the respondents, program participants, clients, and other stakeholders with whom they work.

Responsibilities for General and Public Welfare
- Evaluators articulate and take into account the diversity of interests and values that may be related to the general and public welfare.

American Evaluation Association's Guiding Principles for Evaluators, Shadish et al. 1995.

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American Evaluation Association

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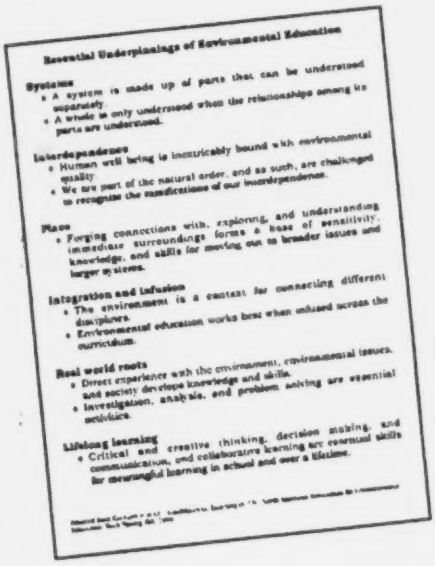


Essential Underpinnings of Environmental Education

Systems

- A system is made up of parts that can be understood separately.
- A whole is only understood when the relationships among its parts are understood.

Interdependence

- Human well-being is inextricably bound with environmental quality.
- We are part of the natural order, and as such, are challenged to recognize the ramifications of our interdependence.

Place

- Forging connections with, exploring, and understanding immediate surroundings forms a base of sensitivity, knowledge, and skills for moving out to broader issues and larger systems.

Integration and infusion

- The environment is a context for connecting different disciplines.
- Environmental education works best when infused across the curriculum.

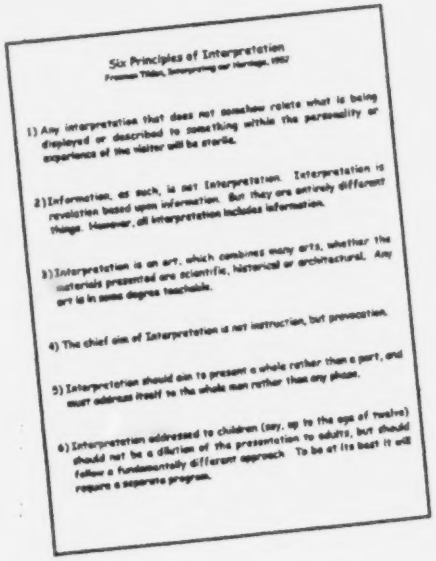
Real world roots

- Direct experience with the environment, environmental issues, and society develops knowledge and skills.
- Investigation, analysis, and problem solving are essential activities.

Lifelong learning

- Critical and creative thinking, decision making, and communication, and collaborative learning are essential skills for meaningful learning in school and over a lifetime.

Adapted from Excellence in EE—Guidelines for Learning (K-12). North American Association for Environmental Education. Rock Spring, GA, 1999.



Six Principles of Interpretation

Freeman Tilden, Interpreting our Heritage, 1957

- Any interpretation that does not somehow relate what is being displayed or described to something within the personality or experience of the visitor will be sterile.
- Information, as such, is not Interpretation. Interpretation is revelation based upon information. But they are entirely different things. However, all interpretation includes information.
- Interpretation is an art, which combines many arts, whether the materials presented are scientific, historical or architectural. Any art is in some degree teachable.
- The chief aim of Interpretation is not instruction, but provocation.
- Interpretation should aim to present a whole rather than a part, and must address itself to the whole man rather than any phase.
- Interpretation addressed to children (say, up to the age of twelve) should not be a dilution of the presentation to adults, but should follow a fundamentally different approach. To be at its best it will require a separate program.

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Appendix 2: Resource Guide

The following resource list consists of publications that were mentioned by participants during the Summit, as well as those found in electronic literature databases. In addition, certain sources were explored more intensely and mined for publications of interest. These include:

- the Journal of Environmental Education
- the Canadian Journal of Environmental Education
- the International Journal of Environmental Education and Information
- the Southern African Journal of Environmental Education
- the Journal of Interpretation Research
- the "EPA Environmental Education Resources" web page (http://www.epa.gov/enviroed/resources.html)
- the "NAAEE Publication Descriptions" web page (http://www.naaee.org/html/pubdescrips.htm)
- the "American Camping Association Camp Research & Trends" web page (http://www.acacamps.org/research/)
- Visitor Studies: Theory, Research, and Practice. Selected papers from the Visitor Studies Association Conferences

Sources were selected mostly by their titles, as opposed to abstracts. In this way, some important and relevant pieces might have been left out and others, not so significant, might have been included. The review did not include a search of major themes in the broader databases. It focused on searches at specific periodical journals. In this way, it does not refer to many books and audiovisual materials.

- ■ audio and/or visual aid material
- ❑ book
- ● journal article, report, book chapter or book article
- ▼ web page

2000

❑ North American Association for Environmental Education, National Project for Excellence in Environmental Education (2000). *Guidelines for Excellence: The Initial Preparation of Environmental Educators*. Washington, DC: North American Association for Environmental Education. ISBN: 188400878X.

▼ EdGateway: http://www.edgateway.net/

▼ EE Link: http://eelink.net/

▼ Environmental Education and Training Partnership (EETAP): http://www.eetap.org/

▼ National Pollution Prevention Center for Higher Education: http://www.umich.edu/%7Enppcpub/

▼ NatureServe: http://www.natureserve.org/

▼ The EETAP Resource Library: http://www-comdev.ag.ohio-state.edu/eetap/index.html

▼ The GLOBE Program: http://www.globe.gov/

▼ The VINE (Volunteer-led Investigations of Neighborhood Ecology; North American Association for Environmental Education) evaluation program. Contact: http://eelink.net/~npeee/html/2_shortnut.html#VINE and http://naaee.org/

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Address:
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Email: AEA@kistcon.com

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Contact Information:
Address:
Charity Krueger
Aullwood Audubon Center
1000 Aullwood Road
Dayton, OH 45414
Phone: 1-800-490-ANCA
Fax: 937-890-2382
E-mail: ckrueger@audubon.org

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Fax: 202/783-7207
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Fax: (615) 331 9020
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Contact Information:
Address:
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Washington DC 20009-5708
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Fax (202) 884-8455
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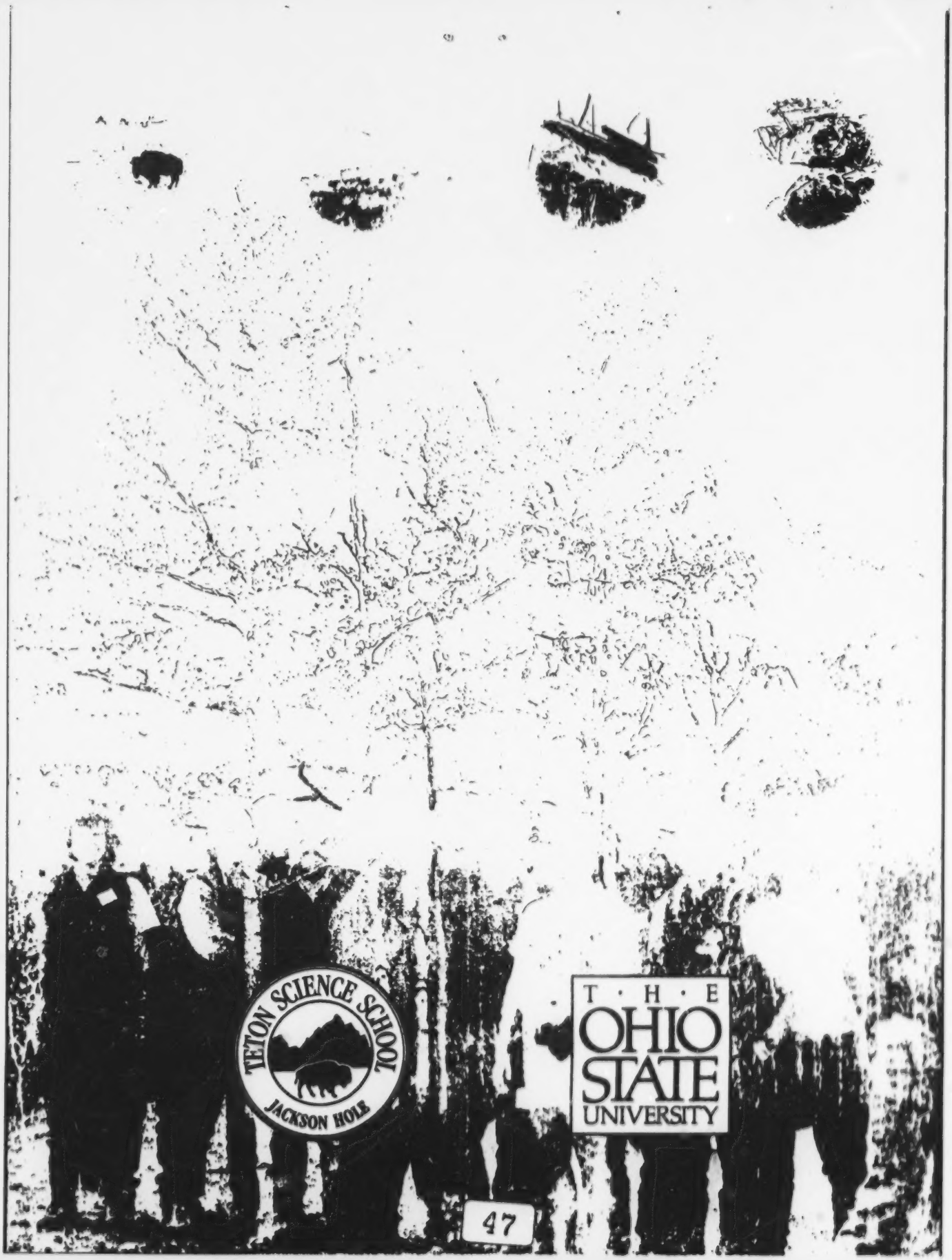
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